SHARP Service Manual

MODEL ICC-80

SPECIFICATIONS

Frequency Range	
AM	520 ~ 1620 kHz
FM	87.6 ~ 108 MHz
Intermediate Frequency	
AM	452 kHz
FM	10.7 MHz
Power Output	
Undistorted	3.5W + 3.5W
Maximum	5W + 5W
Speaker	16cm P.D.S. 4 ohm with speaker boxes (CP-23x2).
Power Supply	DC 12V Car battery (±ground changeable)
Dimensions	16cm (W) x 5cm (H) x 16cm (D)
Weight	1.9 Kg
Controls	Manual tuning (right), Off-volume (left) Function push button (pre setting), Tone (left), Balance (right).
Other Features	AM/FM band indicator, Stereo indicator, Lighting dial, FM MONO-STEREO auto changer.

IC Complement

IC-1	SR-103	FM Multiplex
IC-2	IC-908	Audio Amplifier & Driver
IC-3	IC-908	Audio Amplifier & Driver

TRANSISTOR COMPLEMENT

Q1	2SC535Ⓑ	FM RF Amplifier
Q2	2SC535Ⓐ	FM Mixer
Q3	2SC461Ⓑ	FM Oscillator
Q4	2SC460Ⓐ	FM 1st IF, AM 1st IF Amplifier
Q5	2SC460Ⓑ	FM 2nd IF, AM 2nd IF Amplifier
Q6	2SC460Ⓐ	FM 3rd IF Amplifier
Q7	2SC460Ⓑ	FM 4th IF Amplifier
Q8	2SC460Ⓑ	AM RF Amplifier
Q9	2SC460Ⓐ	AM Converter
Q10, Q11	2SC458Ⓑ	FM Canceller
Q12, Q14	2SC1013Ⓡ	Audio Output (Matched Pair)
Q13, Q15	2SC1013Ⓡ	Audio Output (Matched Pair)
Q16	2SC458Ⓒ	STEREO Lamp Amplifier

CHASSIS REMOVAL

1. Remove the screws retaining the top and bottom covers on the cabinet, and then remove the top and bottom covers.
2. Remove the lead wire and condenser connecting chassis to the printed circuit board.
3. Remove the screw retaining the radiation panel on the back of the cabinet.
4. Remove the screws retaining the printed circuit board.
5. Remove the printed circuit board from the cabinet.

SHARP CORPORATION OSAKA, JAPAN

GENERAL DESCRIPTION

The circuitry used in this car radio incorporates 16 transistors 18 diodes and 3 IC (Integrated circuit).
An external antenna feeds the AM broadcasting signal to the converter. The AM signal then goes through 2 IF amplifiers to the diode detector and then to the audio stages.
An external antenna feeds the incoming FM or FM STEREO broadcasting signal to the FM RF amplifier. The FM mixer, 4 IF amplifiers, 2 diodes discriminator and multiplex (MPX) circuitry.
The audio signal passes through the 2 IC and push-pull audio output stages for each channel.
An AM AVC voltage is fed back to the RF amplifier and 1st IF amplifier circuit.
An AFC voltage is fed back to the FM oscillator circuit.

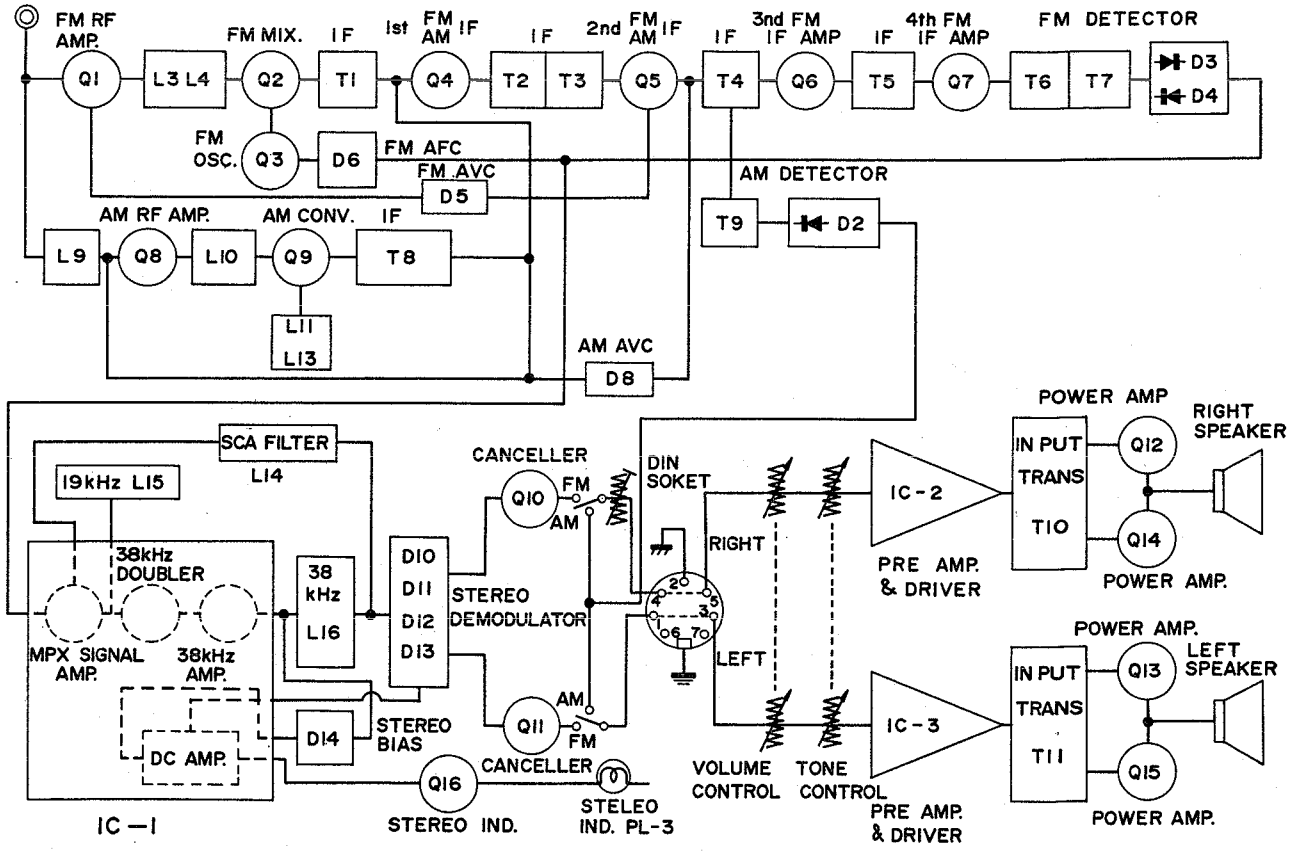


Figure 1 Block Diagram

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows;

1) Connect an output meter across the speaker voice coil lugs.
2) Set the volume control to maximum.
3) Attenuate the signals from the generator enough to swing the most sensitive range of output meter.
4) Use a non-metallic alignment tool.
5) Repeat adjustments to insure good results.

AM ALIGNMENT CHART

Signal generator			Receiver		Adjustment
Step	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	Connect signal generator through a dummy to the external antenna. Ground lead to the receiver chassis. (Refer to Fig. 2)	Exactly 452kHz (400Hz, 30%, AM modulated)	The highest frequency range.	Adjust for maximum output on speaker voice coil lugs.	T8
2	Same as step 1	Exactly 515kHz (400Hz, 30%, AM modulated)	The lowest frequency range.	Same as step 1	L13
3	Same as step 1	Exactly 1650kHz (400Hz, 30%, AM modulated)	Same as step 1.	Same as step 1	C75
4	Same as step 1	Exactly 1400kHz (400Hz, 30%, AM modulated)	1400kHz	Same as step 1	C63, C70
5	Repeat steps 2, 3 and 4 until no further improvement can be made.				

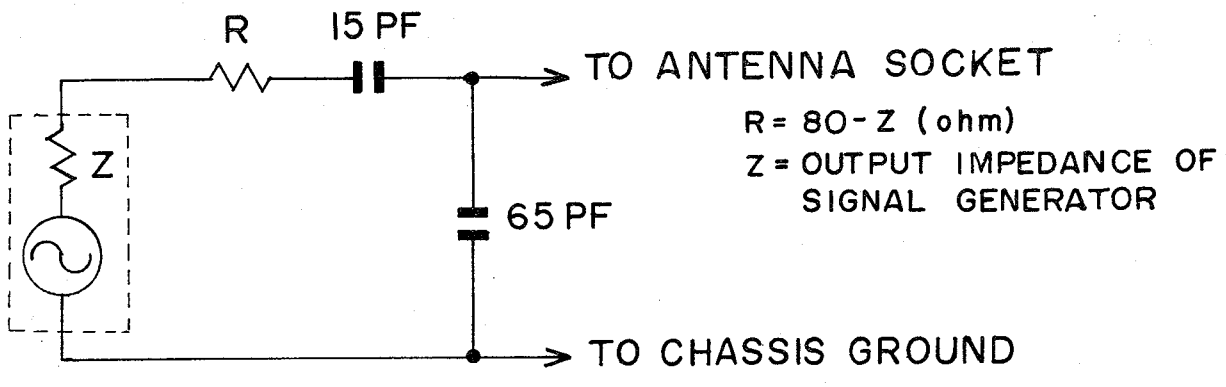


Figure 2 AM Dummy

FM ALIGNMENT CHART

Signal generator			Receiver		Adjustment
Step	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	Connect signal generator through a 1000 PF capacitor to converter emitter, test point TP1 of Q2. Connect generator ground lead to the receiver chassis.	Exactly 10.7MHz (400Hz, 30%, FM modulated)	The lowest frequency range.	Connect VTVM (0.1 volt range DC scale) between TP2 and chassis ground.	T5 T4 T3 T2 T1
2	Same as Step 1	Exactly 10.7MHz (Unmodulated)	Same as Step 1.	Connect VTVM (0.1 volt range DC scale) between TP3 and chassis ground. (See NOTE A)	T7 T6
3	Connect signal generator through a dummy including output inpedance of signal generator to the external antenna. Ground lead of generator to the receiver chassis. (Refer to Figure 3)	Exactly 87.1MHz (400Hz, 30%, FM modulated)	Same as Step 1.	Adjust for maximum output at speaker voice coil.	C25
4	Same as Step 3.	Exactly 98MHz (400Hz, 30%, FM modulated)	The highest frequency range. (98MHz).	Same as Step 3.	C9
5	Repeat steps 3 and 4 until no further improvement can be made.				

NOTE A:
1. Connect VTVM (0.1 volt range D.C. scale) between TP3 and chassis ground.
2. Adjust T6 for 0 volt reading on VTVM.
3. Change signal generator frequency 10.7MHz + 100kHz and −100kHz approx.
4. Adjust T7 for balanced peaks. Peak separation should be approx. 200kHz.

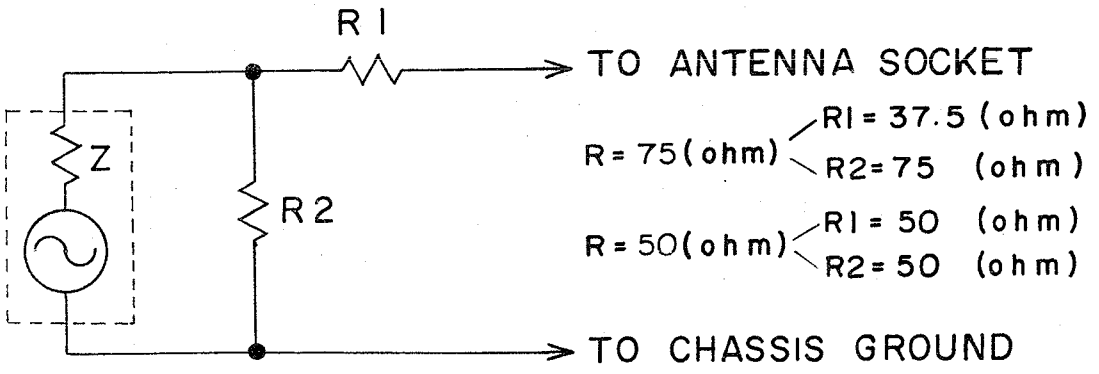


Figure 3 FM Dummy

FM STEREO ALIGNMENT

A) SCA Trap Filter (L14) Adjustment

1. Connect the signal generator to TP3 through a 10 MFD capacitor.
2. Set the frequency of the signal generator to between 65kHz – 67kHz.
3. Connect the VTVM to TP5. Set the VTVM swing to minimum by adjusting L14.

B) 19kHz Alignment

1. Connect the signal generator to TP3 through a 10MFD capacitor.
2. Set the frequency of the signal generator to 19kHz.
3. Connect the VTVM to TP4. Set the VTVM swing to maximum by adjusting L15, L16.

C) Separation Ratio

1. Connect an FM Stereo simulator to the antenna socket through the FM dummy.
2. Connect a VTVM accross left speaker.
3. Feed in right channel signal only.
4. Adjust L15 and L16 for minimum reading. Note reading.
5. Set stereo simulator to left channel signal only.
6. Connect a VTVM across right speaker.
7. Adjust R80 for balance between the two readings.
8. Repeat steps 2, 3, 5, 6 and 7 to obtain equal readings and more than 30dB difference between channels.

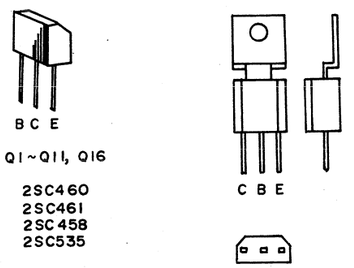


Figure 4 Transistor Basing

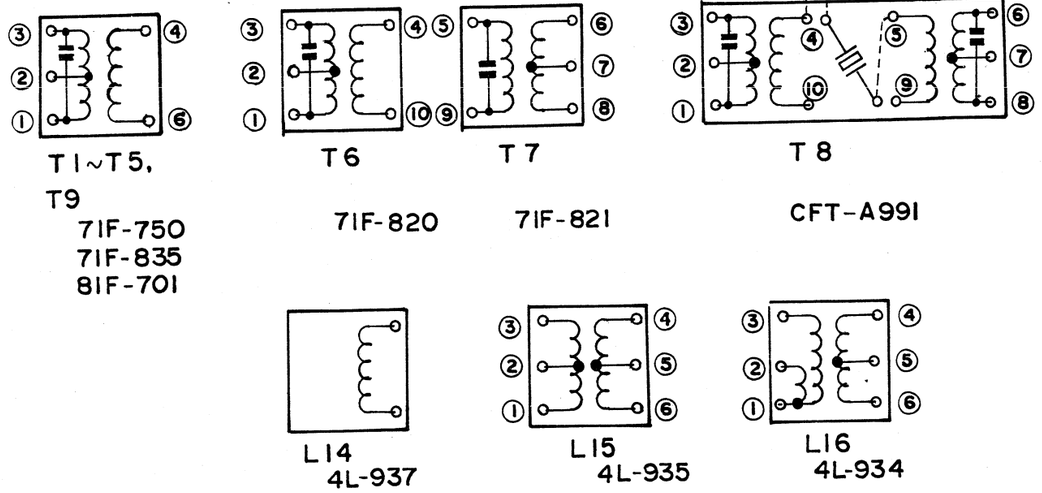
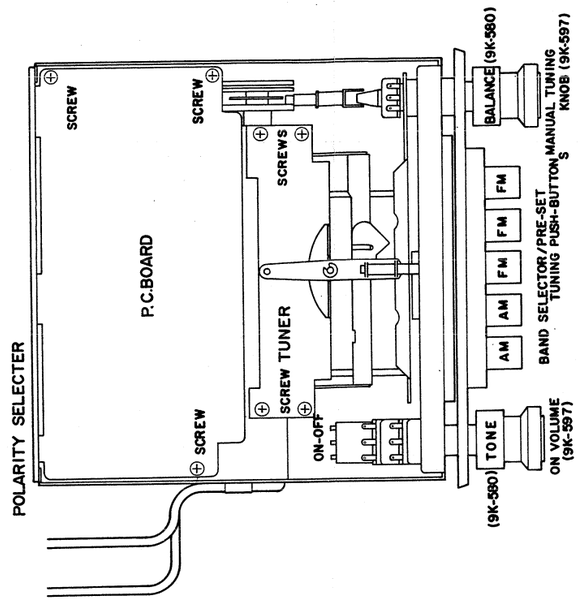


Figure 5 Transformer Bottom View



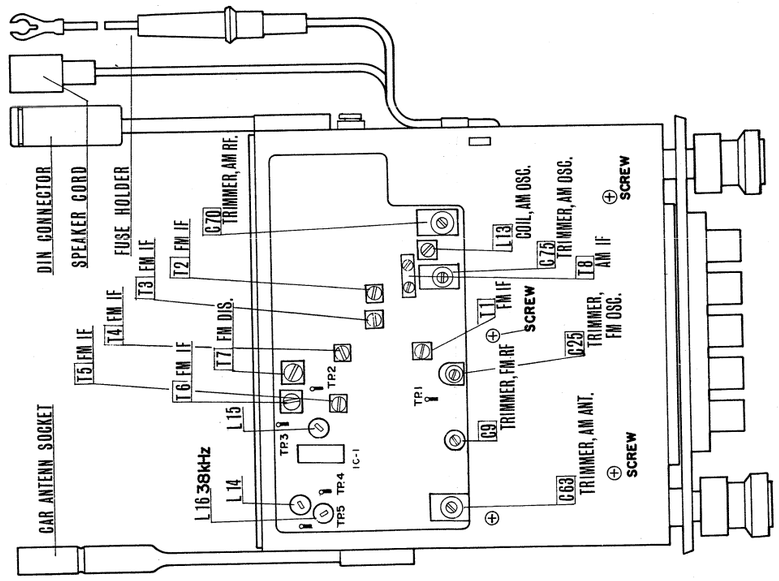


Figure 6 Chassis Layout

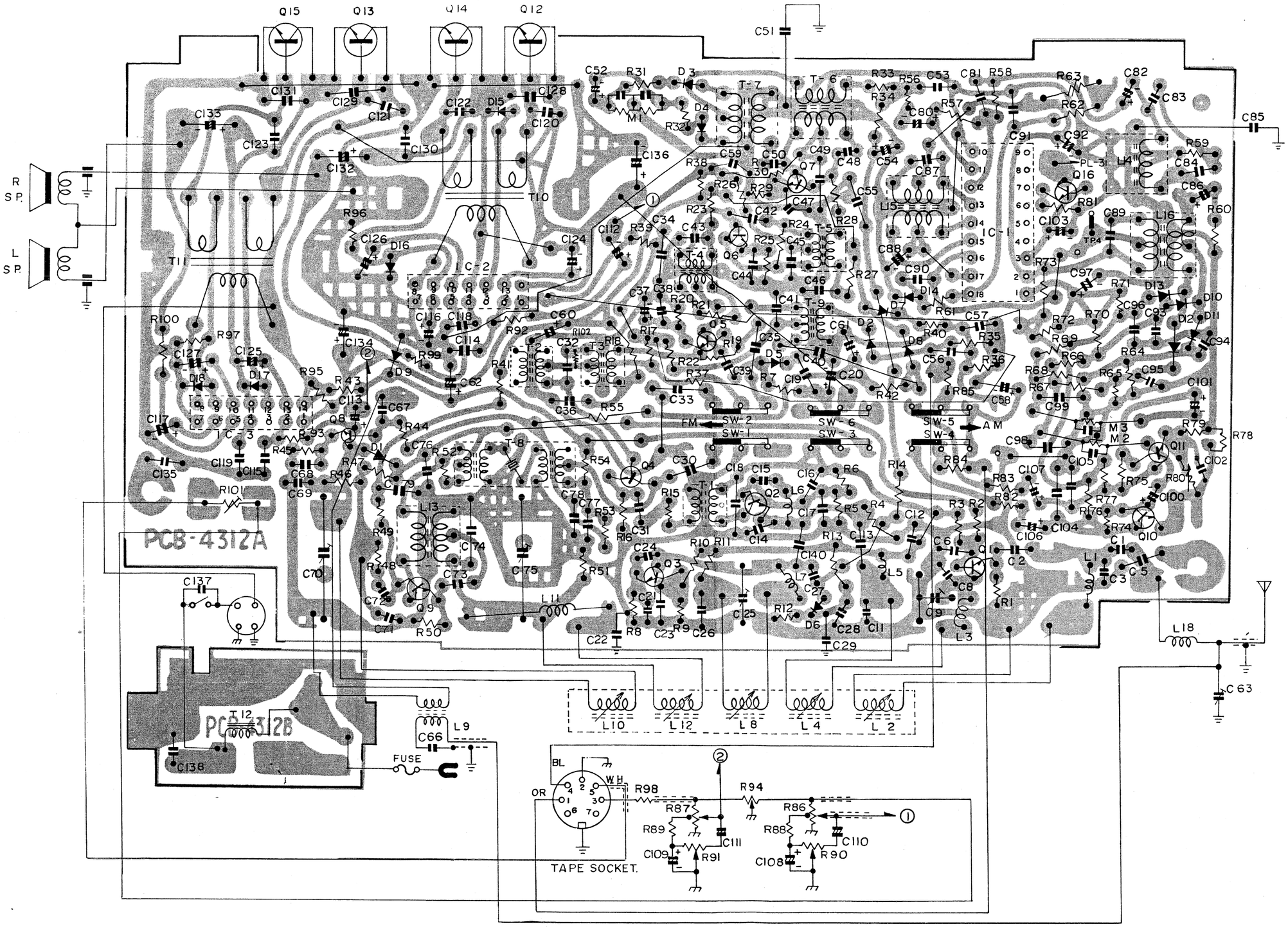


Figure 7 Wiring Side of P.C. Board

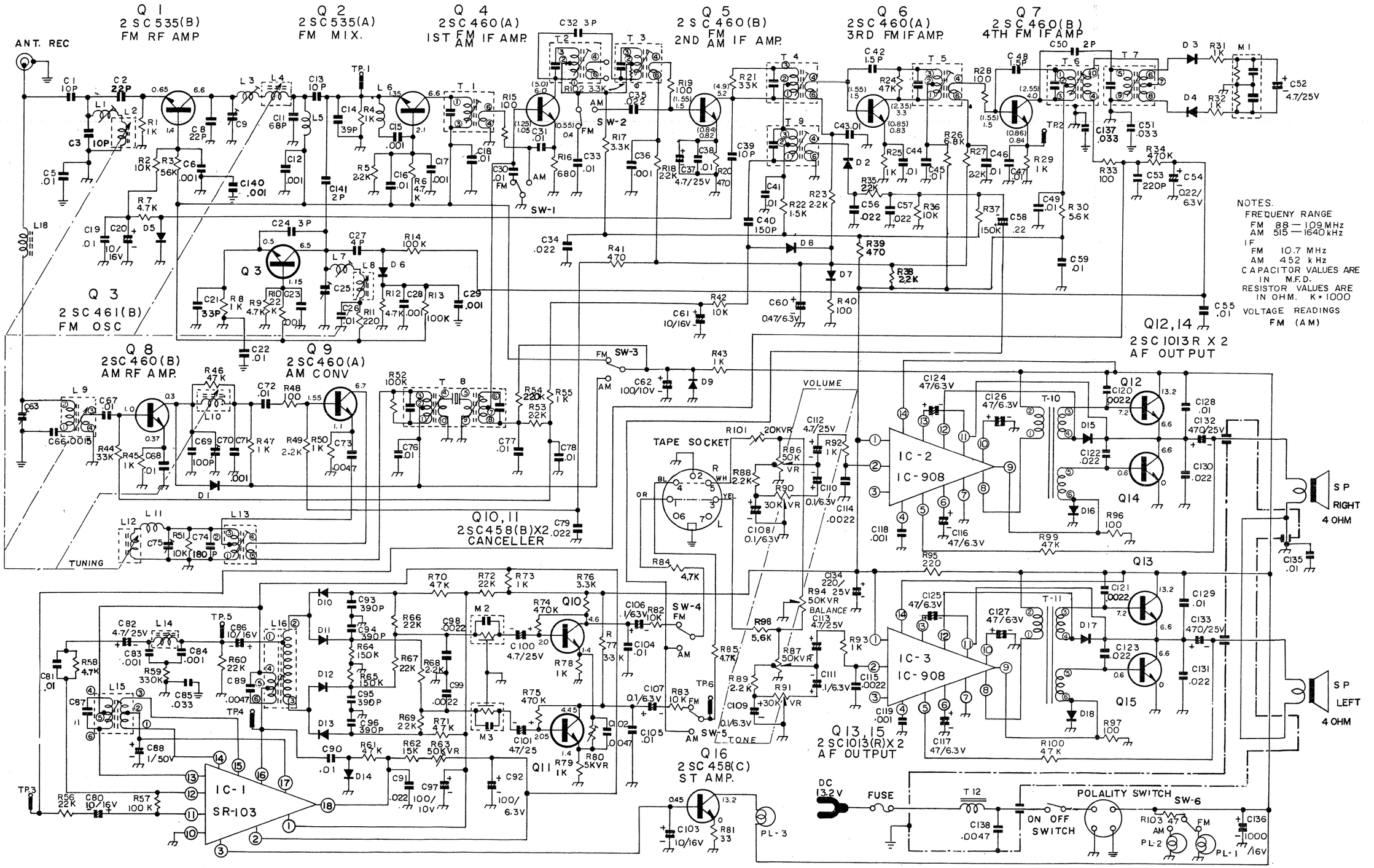


Figure 8 Schematic Diagram

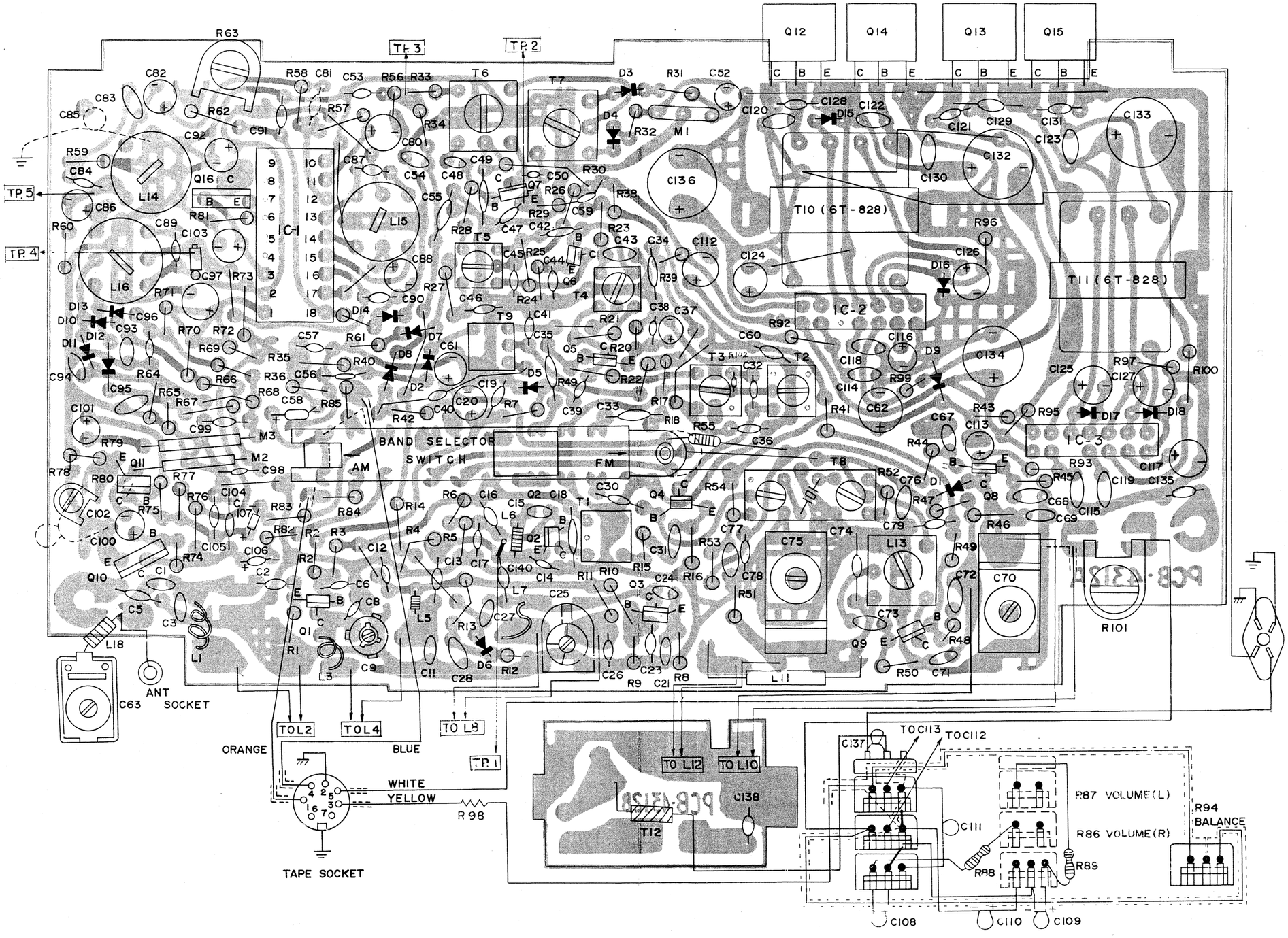


Figure 9 Component Side of P.C. Board

PARTS LIST

MODEL ICC-80

REF NO.	PART NO.	DESCRIPTION	
		RESISTORS	
R1,R25, R31,R32, R43,R45, R47,R50, R73,R78, R79,R92, R93	1/4SU-1KK	1K ohm	
R2,R36, R42,R82, R83	1/4SU-10KK	10K ohm	
R3	1/4SU-56KK	56K ohm	
R4,R29, R55	1/4SA-1KK	1K ohm	
R5,R18, R23,R27, R35,R38, R49,R53	1/4SU-2.2KK	2.2K ohm	
R6,R7, R12,R58, R84,R85	1/4SU-4.7KK	4.7K ohm	
R8	1/8SU-1KK	1K ohm, 1/8W, 10%, Carbon	
R9	1/4SU-4.7KK	4.7K ohm	
R10	1/8SU-22KK	22K ohm, 1/8W, 10%, Carbon	
R11,R95	1/4SU-220K	220 ohm	
R13,R14, R52,R57	1/4SU-100KK	100K ohm	
R15	1/8SU-100K	100 ohm, 1/8W, 10%, Carbon	
R16	1/8SU-680K	680 ohm, 1/8W, 10%, Carbon	
R17,R76, R77	1/4SU-3.3KK	3.3K ohm	
R19,R28, R33,R40, R48,R96, R97	1/4SU-100K	100 ohm	
R20,R39, R41	1/4SU-470K	470 ohm	
R21,R44	1/4SU-33KK	33K ohm	
R22	1/4SU-1.5KK	1.5K ohm	
R24,R46, R61,R70, R71,R99, R100	1/4SU-47KK	47K ohm	
R26	1/4SU-6.8KK	6.8K ohm	
R30,R98	1/4SU-5.6KK	5.6K ohm	
R34,R74, R75	1/4SU-470KK	470K ohm	
R37,R64, R65	1/4SU-150KK	150K ohm	
R51	1/8SU-10KK	10K ohm	
R54	1/4SU-220KK	220K ohm	
R56,R60, R66,R67, R68,R69,	1/4SU-22KK	22K ohm	

REF. NO.	PART NO.	DESCRIPTION	
R72	1/4SU-22KK	22K ohm	
R59	1/4SU-330KK	330K ohm	
R62	1/4SU-15KK	15K ohm	
R63	8V-723	50K ohm, Pot., Stereo Indicator Level Adjust	
R80	8V-554	5K ohm, Pot., Canceller	
R81	1/4SU-33K	33 ohm	
R88,R89	1/4SA-2.2KK	2.2K ohm	
R86,R87 R90,R91	8V-886	Volume (50K ohm, Pot.,) and Tone (30K ohm, Pot.,) Control	
R94	8V-723	50K ohm, Pot., Balance Control	
R101		20K ohm, Pot, Balancer of Level Adjust	
R102	1/4SA-3.3KK	3.3K ohm	
R103	1/4SA-47K	47 ohm	
All resistors without specification are 1/4W, 10%, Carbon type			
		CAPACITORS	
C1,C3, C13,C39	D-5-108D	10PF, 50V, ±0.5PF, Discap	
C2,C8	D-5-228J	22PF, 50V, ±5%, Discap	
C5,C16, C18,C19, C22,C26, C31,C55, C67,C68, C76,C77, C78,C135	D-5-105Z	.01MFD, 50V, Discap	
C6,C15, C17,C36	D-5-106Z	.001MFD, 50V, Discap	
C12	D-5-106M	.001MFD, 50V, ±20%, Discap	
C9	TO-839	Trimmer, FM RF	
C11	D-5-688J	68PF, 50V, ±5%, Discap	
C14	D-5-398J	39PF, 50V, ±5%, Discap	
C20,C61 C80,C86, C103	CU1.6-102Q	10MFD, 16V, Electrolytic	
C21	D-5-338J	33PF, 50V, ±5%, Discap	
C23,C28, C29,C65, C118,C119, C141	D-5-106M	.001MFD, 50V, ±20%, Discap	
C24	DUJ-5-309J	3PF, 50V, ±5%, Discap	
C25	TO-705	Trimmer, FM Oscillator	
C27	DWK-5-409C	4PF, 50V, ±0.25PF, Discap	
C30,C33, C38,C41, C43,C44, C45,C46, C47,C49, C59,C72,	D-5-105M	.01MFD, 50V, ±20%, Discap	

REF. NO.	PART NO.	DESCRIPTION	
C81,C90, C104,C105, C128,C129	D-5-105M	.01MFD, 50V ±20% Discap	
C32	D-5-309C	3PF, 50V, ±0.25PF, Discap	
C34,C35, C79,C91	D-5-225Z	.022MFD, 50V, Discap	
C37,C52, C82,C100, C101,C112, C113	CU2.5-473R	4.7MFD, 25V, Electrolytic	
C40	DS-5-157J	150PF, 50V, ±5%, Discap	
C42,C48	D-5-159C	1.5PF, 50V, ±0.25PF, Discap	
C50,C140	D-5-209D	2PF, 50V, ±0.5PF, Discap	
C51,C85, C137	D-5-335P	.033MFD, 50V, Discap	
C53	D-5-227J	220PF, 50V, ±0.5%, Discap	
C54,C58	AD-06-224M	.22MFD, 6.3V, ±20%, Electrolytic	
C56,C57, C120,C121, C122,C123 C130,C131	ML-5-225M	.022MFD, 50V, ±20%, Mylar	
C60	AD-06-474M	.47MFD, 6.3V, ±20%, Electrolytic	
C62	CU-1-101Q	100MFD, 10V, Electrolytic	
C63	XTO-707	Trimmer, AM Antenna	
C66	S-5-156J	.0015MFD, 50V, ±5%, Styrol	
C69	D-5-107J	100PF, 50V, ±5%, Discap	
C70	TO-846	Trimmer, AM RF	
C71,C83, C84	S-5-106J	.001MFD, 50V, ±5%, Styrol	
C73,C138	ML-5-476M	.0047MFD, 50V, ±20%, Mylar	
C74	DRH-5-187J	180pF, 50V, ±5%, Discap	
C75	TO-846	Trimmer, AM Oscillator	
C87	S-5-105J	.01MFD, 50V, ±5%, Styrol	
C88	CU-5-103R	1MFD, 50V, Electrolytic	
C89	S-5-476J	.0047MFD, 50V, ±5%, Styrol	
C92	CU-06-101Q	100MFD, 6.3V, Electrolytic	
C93,C94 C95,C96	S-5-397J	390PF, 50V, ±5%, Styrol	
C97	CU-1-101Q	100MFD, 10V, Electrolytic	
C98,C99, C114,C115	D-5-226M	.0022MFD, 50V, ±20%, Discap	
C102	D-5-476M	.0047MFD, 50V, ±20%, Discap	
C106,C107, C108,C109, C110,C111	AD-06-104M	.1MFD, 6.3V, ±20%, Electrolytic	
C116,C117, C124,C125, C126,C127	CU-06-472Q	47MFD, 6.3V, Electrolytic	
C132,C133	CU2.5-471Q	470MFD, 25V, Electrolytic	
C134	CU2.5-221Q	220MFD, 25V, Electrolytic	
C136	CU1.6-100Q	1000MFD, 16V, Electrolytic	

PACKAGED CIRCUITS

M1	PRC-403	Capristor	
M2,M3	PRC-413	Capristor	

COILS AND TRANSFORMERS

L1	7L-630C	Coil, FM antenna	
L2,L4, L8,L9, L10,L12	XSPT-932	Coil, Tuning assembly L2,L4,L8 FM Tuning L9,L10,L12 AM Tuning	
L3	7L-654C	Coil, FM RF	
L5	7L-984	Coil, FM RF	
L6	7L-925	Coil, FM Choke	
L7	8L-335B	Coil, FM Oscillator	
	7L-906	Coil, MW Oscillator	
	7L-490B	Coil, MW Oscillator	

REF. NO.	PART NO.	DESCRIPTION	
L14	4L-937P	Coil, MPX 67kHz Trap	
L15	4L-935	Coil, FM MPX 19kHz	
L16	4L-934	Coil, FM MPX 38kHz Signal Detector	
L18	7L-920	Coil, Antenna Choke	
T1	7IF-750	Transformer, FM 1st IF	
T2,T3	7IF-750	Transformer, FM 2nd IF	
T4	7IF-835	Transformer, FM 3rd IF	
T5	7IF-835	Transformer, FM 4th IF	
T6	7IF-820	Transformer, FM 5th IF	
T7	7IF-821	Transformer, FM Discriminator	
T8	CFT-A991	Transformer, AM 1st IF	
T9	8IF-701	Transformer, AM 2nd IF	
T10,T11	6T-828	Transformer, Audio Input	
T12	9T-740	Transformer, Power Choke	

SEMICONDUCTORS

Q1	2SC535Ⓑ	Transistor, FM RF Amp.	
Q2	2SC535Ⓐ	Transistor, FM Mixer	
Q3	2SC461Ⓡ	Transistor, FM Oscillator	
Q4	2SC460Ⓐ	Transistor, FM 1st IF/AM 1st IF Amp.	
Q5	2SC460Ⓑ	Transistor, FM 2nd IF/AM 2nd IF Amp.	
Q6	2SC460Ⓐ	Transistor, FM 3rd IF Amp.	
Q7	2SC460Ⓑ	Transistor, FM 4th IF Amp.	
Q8	2SC460Ⓑ	Transistor, AM RF Amp.	
Q9	2SC460Ⓐ	Transistor, AM Converter	
Q10,Q11	2SC458Ⓑ	Transistor, FM Canceller	
Q12,Q14	2SC1013Ⓡ	Transistor, Audio Output (Matched Pair)	
Q13,Q15	2SC1013Ⓡ	Transistor, Audio Output (Matched Pair)	
Q16	2SC458Ⓒ	Transistor, FM STEREO Indicator	
D1	1N34A	Diode, AM AVC	
D2	1N34A	Diode, AM Detector	
D3,D4	1N60	Diode, FM Discriminater	
D5	1N34A	Diode, FM AVC	
D6	1S85	Diode, FM AFC	
D7	HV-46	Diode, Regulator	
D8	1N34A	Diode, AM AVC	
D9	TR-7S	Diode, Zener (Power Voltage Stabilizer)	
D10,D11, D12,D13	1N60	Diode, MPX Switching	
D14	1N34A	Diode, MPX Indicator Lamp (Rectifier)	
D15,D16, D17,D18	MV-1	Diode, Varistor (AOC)	

MISCELLANEOUS

	X9CAB4312A	Cabinet, Body	
	9CAB-4312B	Cabinet, Bottom	
	9K-579	Knob, On-Off Volume Control and Tuning Control	
	9K-580	Knob, Tone and Balance Control	
	DIAL-4312	Dial	
	PANEL-4144	Panel, Decoration	
	DIALP4312B	Backplate, Dial	
	XDIALP312A	Dial Plate, Front	
	DIALP4144A	Dial Plate	
	DEC-M-4144	Decoration Metal	
	DEC-P4144A	Decoration Plate, Right	
	DEC-P4144B	Decoration Plate, Left	
	PL-DEC-COV	Decoration Cover Pilot Lamp (Red, Green)	

REF. NO.	PART NO.	DESCRIPTION	
	S-BUTA4312	Cover, Bottom	
	DIAL-BANE	Spring, Dial	
	PL-DEC-COV	Decoration Cover, Pilot Lamp (White)	
	PCB-4312A	Printed Circuit Board	
	PCB-4312B	Printed Circuit Board, Power Circuit	
	SO-950	Socket, Polarity Selector	
	PG-429	Plug, Polarity Selector	
	FH-927	Holder, Fuse	
	HON-P4312	Plate, Heat Sink	
	36S-32	Switch, Band Selector	
	3PL-503	Pilot Lamp	
	3FUSE-2.3A	Fuse, 2.3A	
	ACC-737	Cord, Speaker	
	XCP-23-2	Box, Speaker	
	3CAB-4462	Cabinet, Speaker Box	
	XSPT-932	Tuner	
	16P-35A	Speaker	
	T-951	Terminal, Speaker Cord	
	ACC-735	Cord, Speaker (30cm)	
	SO-801	Socket, External Antenna	
	SO-099	Socket, DIN	